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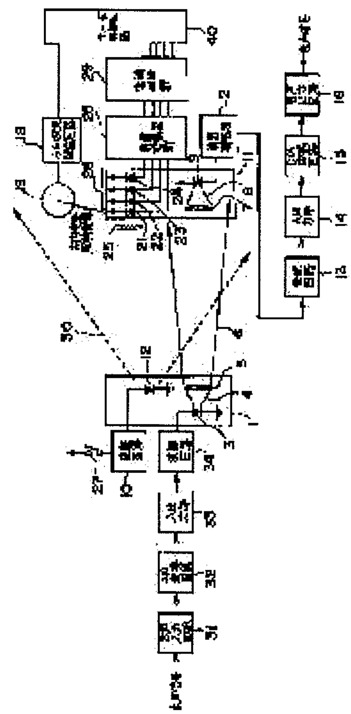
(54) **OPTICAL SPACE TRANSMITTER**

(57)Abstract:

PURPOSE: To surely specify a reception direction based on each output level difference of a light receiving element by sending a light for direction adjust ment to a comparatively wide angle area and using plural light receiving elements arranged spatially different locations so as to detect the light, thereby facilitating the reception of the projection light for direction adjustment.

CONSTITUTION: A light sent from a light emitting element 3 over a comparatively narrow angular area is received by a light receiving element 9 to regenerate a transmission signal and a light 30 set over a comparatively wider angular area than the projection angular area of the light emitting element 3 from the direction adjustment light emitting element 12 is received by a direction detection light receiving element array 26 in which plural light receiving elements 21-24 are arranged at different locations and the light receiving direction of the light receiving element 9 is controlled through a servo control circuit 40 based on the level difference of the signal.



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CLAIMS

[Claim(s)]
[Claim 1] In the optical communication device to which floodlights the light modulated based on the transmission signal with a floodlighting means, receives this floodlighted light with a light-receiving means, and it restores A 2nd floodlighting means to floodlight light with a large floodlighting include angle more narrowly [a modulation band] than the modulation band of said modulated light, A 2nd light-receiving means to detect the level difference between two or more signals which might be received by two or more photo detectors arranged in the light from this 2nd floodlighting means in a spatially different location, The optical communication device characterized by having the control means which controls the light-receiving direction of said light-receiving means based on the level difference acquired with this 2nd light-receiving means.
[Claim 2] In the optical communication device to which floodlights the light modulated based on the transmission signal with a floodlighting means, receives this floodlighted light with a light-receiving means, and it restores A 2nd floodlighting means to floodlight light with a large floodlighting include angle more narrowly [a modulation band] than the modulation band of said modulated light, A 2nd light-receiving means to detect the level difference between two or more signals which might be received by two or more photo detectors arranged in the light from this 2nd floodlighting means in a spatially different location, The optical communication device characterized by having a direction detection means to detect the light-receiving direction of said light-receiving means based on the level difference acquired with this 2nd light-receiving means.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to a suitable optical communication device to apply to the wireless loudspeaker which starts an optical communication device, especially carries out space transmission of the sound signal using infrared radiation, and perform efficiently include-angle adjustment of the floodlighting section and a light sensing portion.
[0002]
[Description of the Prior Art] Drawing 5 is the outline block diagram of this conventional optical communication device. In drawing, the voice input circuit where 31 receives the sound signal from the outside, the A/D-conversion circuit which changes into a digital sound signal the analog sound signal into which 32 was inputted from the voice input circuit 31, and 33 are the I/O sections which amplify the digital sound signal from the A/D-conversion circuit 32, and are given to a modulation circuit 34. The light-emitting part which floodlights the infrared radiation which 1 is modulated by the form where it was suitable for optical transmission in the modulation circuit 34, and contains a signal component, and 11 are light sensing portions which receive the floodlighting infrared radiation 6 from a light-emitting part 1. In a light-emitting part 1, the light emitting device in which 3 generates the luminescence infrared radiation 4, and 5 are the condenser lenses for floodlighting for condensing the luminescence infrared radiation 4 from a light emitting device 3, and floodlighting to space as floodlighting infrared radiation 6. Moreover, in a light sensing portion 11, the condenser lens for light-receiving for 7 condensing the floodlighting infrared radiation 6 from space, and receiving as light-receiving infrared radiation 8 and 9 are photo detectors which receive the light-receiving infrared radiation 8 through the condenser lens 7 for light-receiving, and obtain a signal component. Moreover, the preamp with which 2 amplifies the signal component which the photo detector 9 received and obtained in a light sensing portion 11, The demodulator circuit for 13 restoring to the signal to which the modulation was able to be applied in the modulation circuit 34 by the side of a light-emitting part 1, and acquiring a digital sound signal, The I/O section for 14 to take out this digital sound signal, the D/A conversion circuit which changes into an analog sound signal the digital sound signal with which 15 was taken out from the I/O section 14, The voice output circuit for 16 amplifying an analog sound signal and outputting outside as a sound signal, The level comparator for 17 detecting the level of the digital sound signal acquired in the demodulator circuit 13, and performing the signal output according to level, The direction modification drive with which 19 makes the vertical direction or a longitudinal direction carry out neck swing actuation of the light-receiving include angle of a light sensing portion 11, The direction modification drive circuit where 18 gives a driving signal to the direction modification drive 19, and 41 are the mountain-climbing servo control circuits 41 which give a control signal to the direction modification drive circuit 18 so that the signal level detected with the level detector 17 may become the highest.
[0003] Although drawing 6 is the external view of a light sensing portion 11, as shown also in drawing, the light sensing portion 11 is put on the rest through the direction modification drive 19 so that the

direction of the light-receiving aperture 20 can be changed freely, and can change the vertical direction and the horizontal sense with the driving signals from the direction modification drive circuit 18.
[0004] In a configuration which was described above, the actuation is explained below.
[0005] The sound signal inputted into the light-emitting part 1 side is suitably amplified by level in the voice input circuit 31, and is given to the A/D-conversion circuit 32. In the A/D-conversion circuit 32, an analog sound signal is changed into a digital sound signal, and is outputted to a modulation circuit 34 through the I/O section 33. In a modulation circuit 34, the form of having been suitable for transmission becomes irregular, and a digital sound signal is given to a light emitting device 3. Consequently, a light emitting device 3 is sent out to the space of the include-angle field to which the luminescence infrared radiation 4 was generated in the form where the modulation was received, and the floodlighting infrared radiation 6 was restricted through the condenser lens 5 for floodlighting.
[0006] The light-receiving infrared radiation 8 which might be condensed at the light sensing portion 11 side using the condenser lens 7 for light-receiving in the floodlighting infrared radiation 6 which the light-emitting part 1 injected in space is received by the photo detector 9. Consequently, although the modulated light-receiving signal is acquired from a photo detector 9, this signal is amplified with a preamp 2, it gets over in a demodulator circuit 13, and a digital sound signal is acquired. This digital sound signal is outputted to the D/A conversion circuit 15 through the I/O section 14, and is changed into an analog sound signal here. This analog sound signal is amplified by the voice output circuit 16, and is outputted to a loudspeaker etc. as a sound signal.
[0007] On the other hand, the digital sound signal acquired in the demodulator circuit 13 is given to a level detector 17. A level detector 17 detects the level of the digital sound signal to which it restored in the demodulator circuit 13, and outputs the signal according to this level. This signal is given to the mountain-climbing servo control circuit 41.
[0008] While the mountain-climbing servo control circuit 41 carries out the monitor of the signal level from a level detector 17, a driving signal is given to the direction modification drive 19 through the direction modification drive circuit 18, the direction of a light sensing portion 11 changes, but well-known mountain-climbing servo control carries out, judging [if it is the direction where signal level becomes high at this time, will judge it as the control direction, and] it as the non-controlling direction, if it is the direction where signal level changes low so that it may come to the place where the signal level of a level detector 17 is the highest.
[0009] In addition, it is greatly dependent on whether the light-receiving aperture 20 of a light sensing portion 11 has turned to the light-emitting part 1 correctly, and if the receive state in a light sensing portion 11 has a bad receive state, it cannot reproduce a good sound signal. For this reason, since the light-receiving direction is changed in the direction in which the signal level detected with a level detector 17 through the direction modification drive 19 in a light sensing portion 11 becomes the highest, it can always hold to the best receive state.
[0010]
[Problem(s) to be Solved by the Invention] The conventional optical communication device changes into an electrical signal the floodlighting infrared radiation 6 containing the transmission signal floodlighted by the space restricted through the condenser lens 5 for floodlighting by the photo detector 9 through the condenser lens 7 for light-receiving as mentioned above from a light emitting device 3. Since it is constituted so that this may be used for level detection, when controlling to the optimal receive direction, moving a light sensing portion 11 through the direction modification drive circuit 18 and the direction modification drive 19 by the mountain-climbing servo control circuit 41, Since the floodlighting include-angle field of the floodlighting infrared radiation 6 was restricted and a transmission signal with level low moreover comparatively would be used, there was a problem that direction adjustment took time amount difficultly to specification of a direction. Furthermore, the light emitting device 3 is unsuitable for being a broadband, for this reason a radiant power output being small, and it having the problem that receiving sensibility is small, for a signal transmission, although a photo detector 9 is also a broadband therefore, and using as it is for direction detection and directional control.
[0011] It is what was made in order to cancel a trouble [like]. this invention -- the above -- While

transmitting the light for direction adjustment to instead of [with a narrow band] to a comparatively large include-angle field by the light emitting device of high power It aims at obtaining the optical communication device which was excellent in responsibility and a controllability making easy reception of the floodlighting light for direction adjustment, and ensuring specification of a receive direction from each output-level difference of a photo detector by detecting this by the photo detector arranged in a spatially different location. [two or more]

[0012]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, an optical communication device according to claim 1 In the optical communication device to which floodlights the light modulated based on the transmission signal with a floodlighting means, receives this floodlighted light with a light-receiving means, and it restores A 2nd floodlighting means to floodlight light with a large floodlighting include angle more narrowly [a modulation band] than the modulation band of said modulated light, A 2nd light-receiving means to detect the level difference between two or more signals which might be received by two or more photo detectors arranged in the light from this 2nd floodlighting means in a spatially different location, It is characterized by having the control means which controls the light-receiving direction of said light-receiving means based on the level difference acquired with this 2nd light-receiving means.

[0013] In order to attain the above-mentioned purpose, moreover, an optical communication device according to claim 2 In the optical communication device to which floodlights the light modulated based on the transmission signal with a floodlighting means, receives this floodlighted light with a light-receiving means, and it restores A 2nd floodlighting means to floodlight light with a large floodlighting include angle more narrowly [a modulation band] than the modulation band of said modulated light, A 2nd light-receiving means to detect the level difference between two or more signals which might be received by two or more photo detectors arranged in the light from this 2nd floodlighting means in a spatially different location, It is characterized by having a direction detection means to detect the light-receiving direction of said light-receiving means based on the level difference acquired with this 2nd light-receiving means.

[0014]

[Function] From a light emitting device, as mentioned above, since it is difficult to move the direction of a photo detector and to adjust the optimal light-receiving direction, in order that the light to which the floodlighting include angle was restricted by high bandwidth may carry out outgoing radiation, by this invention, the light for direction adjustment is prepared separately, this light is received, and direction adjustment of a light-receiving means is performed.

[0015] Namely, since the light of an extensive floodlighting include angle is floodlighted from the 2nd floodlighting means in a narrow-band, This light can be received and the direction dependency of level can be detected easily. And since the level difference of the signal which two or more photo detectors are arranged in a location which is spatially different for the 2nd light-receiving means, and is acquired in these photo detectors changes according to the floodlighting direction of the light from the 2nd floodlighting means, The light-receiving direction can be detected according to this level difference, and a light-receiving means can be automatically controlled in the optimal light-receiving direction.

[0016]

[Example] Hereafter, the example of this invention is explained, referring to a drawing.

[0017] Drawing 1 is the outline block diagram of the optical communication device concerning one example of this invention. The light emitting device for direction adjustment which 12 is attached near the light emitting device 3 in the interior of a light-emitting part 1, and carries out floodlighting sending out of the infrared light 30 for direction adjustment to a comparatively large include-angle field in drawing, 26 is a photo detector array for direction detection which is attached near the photo detector 9 in a light sensing portion 11, receives the infrared light 30 for direction adjustment by four photo detectors 21, i.e., the 1st photo detector, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24, and changes each into an electrical signal. Moreover, 25 is a lens for direction detection for leading the infrared light 30 for direction adjustment injected from the light emitting device

12 for direction adjustment to the photo detector array 26 for direction detection. And the modulation circuit which 10 applies the modulation of the narrow proper format of a band to the light emitting device 12 for direction adjustment, and is made to emit light, A switch for 27 to turn on / turn off actuation of said modulation circuit, the preamp group which amplifies the lightwave signal with which 28 was received by the photo detector array 26 for direction detection, The demodulator circuit group which restores to the light-receiving signal with which 29 was obtained through the preamp group, and 40 are the servo control circuits 40 which output a control signal to the direction modification drive circuit 18 so that each level difference may be lost based on the level difference of two or more recovery signals acquired by the demodulator circuit group 29.

[0018] In a configuration which was described above, it explains according to the explanatory view of the photo detector array 26 for direction detection which showed the actuation below to drawing 2. Incidentally the 1st photo detector 21 which constitutes the photo detector array 26 for direction detection as drawing 2 is shown, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 are arranged in the location where the 1st photo detector 21 differs from the 2nd photo detector 22 horizontally. It is arranged in the location where the 3rd photo detector 23 differs from the 4th photo detector 24 perpendicularly. It is arranged so that the 1st photo detector 21, the 3rd photo detector 23 and the 3rd photo detector 23, the 2nd photo detector 22 and the 2nd photo detector 22, the 4th photo detector 24 and the 4th photo detector 24, and the 1st photo detector 21 may come in the direction of slant, respectively. And the condition of (A), (B), (C), (D), and (E) is shown by relation with the light figure 35 for direction detection of the infrared light 30 for direction adjustment with the lens 25 for direction detection.

[0019] Now, the sound signal inputted into the light-emitting part 1 side is suitably amplified by level in the voice input circuit 31, and is given to the A/D-conversion circuit 32. In the A/D-conversion circuit 32, an analog sound signal is changed into a digital sound signal, and is outputted to a modulation circuit 34 through the I/O section 33. In a modulation circuit 34, the form of having been suitable for transmission becomes irregular, and a digital sound signal is given to a light emitting device 3. Consequently, a light emitting device 3 is sent out to the space of the include-angle field to which the luminescence infrared radiation 4 was generated in the form where the modulation was received, and the floodlighting infrared radiation 6 was restricted through the condenser lens 5 for floodlighting.

[0020] On the other hand, while turning on the switch 36 and a modulation circuit 10 receives a modulation, the light is switched on, and the light emitting device 12 for direction adjustment attached near the light emitting device 3 carries out floodlighting sending out as an infrared light 30 for direction adjustment to an include-angle field comparatively larger than the floodlighting include-angle field of the floodlighting infrared radiation 6 by the light emitting device 3. In addition, since only the modulation of a narrow-band has started, let the output level of the light in this case be comparatively strong level.

[0021] On the other hand, the light-receiving infrared radiation 8 which might be condensed from the comparatively narrow include-angle field at the light sensing portion 11 side using the condenser lens 7 for light-receiving in the floodlighting infrared radiation 6 which the light-emitting part 1 injected in space is received by the photo detector 9. Consequently, although the modulated light-receiving signal is acquired from a photo detector 9, it restores to this signal in a demodulator circuit 13, and a digital sound signal is acquired. This digital sound signal is outputted to the D/A conversion circuit 15 through the I/O section 14, and is changed into an analog sound signal here. This analog sound signal is further amplified by the voice output circuit 16, and is outputted to a loudspeaker etc. as a sound signal.

[0022] On the other hand The photo detector array 26 for direction detection attached near the photo detector 9 the infrared light 30 for direction adjustment currently floodlighted on level comparatively stronger against an include-angle field comparatively larger than the include-angle field of the floodlighting infrared radiation 6 than the floodlighting infrared radiation 6 The 1st photo detector 21, the 2nd photo detector 22, the 3rd photo detector 23, Although light is received through the 4th photo detector 24, it is amplified by each four line by the preamp group 28, recovery detection is carried out in the demodulator circuit group 29, respectively, and this light-receiving signal is given to the servo

control circuit 40. The servo control circuit 40 compares the level of the digital sound signal to which it restored by the demodulator circuit group 29, and sends out the control signal of a direction where each level difference becomes the smallest to the direction modification drive circuit 18.

[0023] Now, the light figure 35 for direction detection on the photo detector array 26 for direction detection by the infrared light 30 for direction adjustment presupposes that it was in drawing 2 (B) or a condition as shown in (C). In this case, the level of the light detected by the 3rd photo detector 23 and the 4th photo detector 24 did not change, but has produced the difference on the level detected by the 1st photo detector 21 and the 2nd photo detector 22. That is, it is shown that the direction of a light sensing portion 11 is not right at a longitudinal direction. Then, the servo control circuit 40 gives the control signal to the right or the left to the direction modification drive circuit 18 according to the level difference of the output of the 1st photo detector 21 and the 2nd photo detector 22. Consequently, the direction modification drive circuit 18 gives the rotation driving signal of a longitudinal direction to the direction modification drive 19, and if a swing and the light figure 35 for direction detection will be in the condition of drawing 2 (A) about a neck at a longitudinal direction and the disregard level difference of the 1st photo detector 21 and the 2nd photo detector 22 is lost, it will stop a light sensing portion 11 based on the command from the servo control circuit 40. On the other hand, the light figure 35 for direction detection on the photo detector array 26 for direction detection by the infrared light 30 for direction adjustment presupposes that it was in drawing 2 (D) or a condition as shown in (E). In this case, the level of the light detected by the 1st photo detector 21 and the 2nd photo detector 22 did not change, but has produced the difference on the level detected by the 3rd photo detector 23 and the 4th photo detector 24. That is, it is shown that the direction of a light sensing portion 11 is not right in the vertical direction. Then, the servo control circuit 40 gives an above or down control signal to the direction modification drive circuit 18 according to the level difference of the output of the 3rd photo detector 23 and the 4th photo detector 24. Consequently, the direction modification drive circuit 18 gives the rotation driving signal of the vertical direction to the direction modification drive 19, and if a swing and the light figure 35 for direction detection will be in the condition of drawing 2 (A) about a neck in the vertical direction and the disregard level difference of the 3rd photo detector 23 and the 4th photo detector 24 is lost, it will stop a light sensing portion 11 based on the command from the servo control circuit 40. By both right and left and the upper and lower sides, the above control is similarly performed, when the sense is not right, and while abolishing the level difference of the 1st photo detector 21 and the 2nd photo detector 22 finally, control is performed in the direction which abolishes the level difference of the 3rd photo detector 23 and the 4th photo detector 24.

[0024] It is made not to do active jamming to transmission of the signal which should be transmitted essentially by suspending actuation of a modulation circuit 10 with a switch 27 in the phase which the above control ended.

[0025] It is greatly dependent on whether the light sensing portion 11 has turned to the light-emitting part 1 correctly, and if the receive state of the transmission signal in a light sensing portion 11 has a bad receive state, it cannot reproduce a good sound signal. On the other hand, it is floodlighted by the comparatively large field different from the transmission signal floodlighted by the comparatively narrow space include-angle field from the light emitting device 3 according to the configuration of this example, and the infrared light 30 for direction adjustment with the strong level of a narrow modulation band is changed into an electrical signal by the photo detector array 26 for direction detection. The best receive state can be acquired by using this for directional control and controlling the include angle of the direction of four directions of a light sensing portion 11 through the servo control circuit 40. That is, when controlling to the optimal receive direction, moving the sense of a light sensing portion 11, detection of the infrared light 30 for direction adjustment becomes easy, and there is an advantage that specification of a direction is trustworthy and can carry out directional control easily. Moreover, after direction adjustment is completed, reduction of effect in the transmission signal of the normal by reduction, cross modulation, etc. of power consumption can be aimed at by stopping actuation of a modulation circuit 10 with a switch 27, and stopping luminescence of the light emitting device 12 for direction adjustment.

[0026] In addition, although a configuration which is made to turn on, modulating the light emitting device 12 for direction adjustment by the narrow band by the modulation circuit 10 was illustrated in the above-mentioned example, if it is not necessary to take the noise by external light into consideration, the same effectiveness can be acquired even if it makes it make the light switch on in direct current. Moreover, although the configuration which does not use a lens is illustrated in the above-mentioned example in order to obtain the infrared light 30 for direction adjustment from the light emitting device 12 for direction adjustment, the lens which can be floodlighted in the range larger than the condenser lens 5 for floodlighting may be applied. On the other hand, although the lens 25 for direction detection is arranged before the photo detector array 26 for direction detection in the light sensing portion 11 side, the same effectiveness can be acquired even if it arranges a mask with which the light which carries out incidence to the 1st photo detector 21 of the photo detector array 26 for direction detection, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 becomes homogeneity, when a light sensing portion 11 turns to the direction of the light emitting device 12 for direction adjustment.
[0027] In addition, although the configuration which has arranged the 1st photo detector 21 of the photo detector array 26 for direction detection, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 collectively behind one lens 25 for direction detection was illustrated in the above-mentioned example As shown in drawing 3 , the 1st photo detector 21, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 are detached and arranged in a cross-joint form. The 1st condenser lens 36, the 2nd condenser lens 37, the 3rd condenser lens 38, and the 4th condenser lens 39 are formed before each component. When it is in the condition that the floodlighting infrared radiation 6 is received by the photo detector 9 the best through the condenser lens 7 for light-receiving Adjusting arrangement may be carried out so that the level of the infrared light 30 for direction adjustment received by the 1st photo detector 21, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 may become equal, and effectiveness can be acquired similarly. Moreover, as shown in drawing 4 , the 1st photo detector 21 which constitutes the photo detector array 26 for direction detection, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 may be arranged in a cross-joint mold so that a photo detector 9 may be surrounded, and the same effectiveness can be acquired. In this case, if the light emitting device 3 and the light emitting device 12 for direction adjustment are fully arranged by the light-emitting part 1 side in near, it is also possible to constitute the condenser lens 7 for light-receiving, the 1st condenser lens 36, the 2nd condenser lens 37, the 3rd condenser lens 38, and the 4th condenser lens 39 from one lens. In this case, when it is in the condition that the floodlighting infrared radiation 6 is received by the photo detector 9 the best through the condenser lens 7 for light-receiving, it is necessary to arrange each component so that the light-receiving level of the 1st photo detector 21, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 may become equal.
[0028] In addition, although the configuration which detects the location of the light figure of the infrared light 30 for direction adjustment was illustrated in each above-mentioned example in order to level distinguish between each 1st photo detector 21 of the photo detector array 26 for direction detection, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 It is also possible to perform direction detection, without using a lens and a mask by giving a difference to the light-receiving include angle of the 1st photo detector 21, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 on four directions. That is, although the infrared light 30 for direction adjustment from the light emitting device 12 for direction adjustment can obtain a disregard level with the highest case where incidence is carried out at right angles to each of the 1st photo detector 21, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 as shown in the explanatory view of drawing 7 Since the include angle is attached to each photo detector, if all components do not serve as optimal include angle, each output-level difference cannot be abolished, but there is only the one direction. For this reason, the direction of outgoing radiation of the infrared light 30 for direction adjustment can be specified from the level difference of each photo detector.
[0029] In addition, although the above-mentioned example explained the sound signal taking the case of the case where optical space transmission is carried out, you may apply to equipment which transmits

the signal of other classes, for example, a video signal and the control signal for computers, a data signal, etc., and the same effectiveness can be acquired.

[0030] Moreover, although the configuration which gives the level difference of the 1st photo detector 21 which constitutes the photo detector array 26 for direction detection from an above-mentioned example, the 2nd photo detector 22, the 3rd photo detector 23, and the 4th photo detector 24 to the servo control circuit 40, and controls the direction of a light sensing portion 11 was illustrated, it is good also as a configuration which displays the output of the demodulator circuit group 29 and adjusts the direction of a light sensing portion 11 manually.

[0031]

[Effect of the Invention] Since according to this invention it constituted so that the light for direction adjustment might be floodlighted besides an optical transmission signal to an include-angle field larger than the include-angle field where an optical transmission signal is floodlighted, and it constituted so that this light might be received by two or more photo detectors as stated above, direction pinpointing of the source of luminescence of an optical transmission signal is easy from each level difference, and there is simple or automatable effectiveness about direction adjustment of a receive section.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the outline block diagram of the optical communication device concerning one example of this invention.
[Drawing 2] It is the explanatory view of the photo detector array for direction detection.
[Drawing 3] It is the explanatory view of other examples of the photo detector array for direction detection.
[Drawing 4] It is the explanatory view of the example of further others of the photo detector array for direction detection.
[Drawing 5] It is the outline block diagram of the conventional optical communication device.
[Drawing 6] It is the external view of a light sensing portion.
[Drawing 7] It is the explanatory view of another example of the photo detector array for direction detection.
[Description of Notations]
1 Light-emitting Part
2 Preamp
3 Light Emitting Device
4 Luminescence Infrared Radiation
5 Condenser Lens for Floodlighting
6 Floodlighting Infrared Radiation
7 Condenser Lens for Light-receiving
8 Light-receiving Infrared Radiation
9 Photo Detector
10 Modulation Circuit
11 Light Sensing Portion
12 Light Emitting Device for Direction Adjustment
13 Demodulator Circuit
14 I/O Section
15 D/A Conversion Circuit
16 Voice Output Circuit
17 Level Detector
18 Direction Modification Drive Circuit
19 Direction Modification Drive
20 Light-receiving Aperture
21 1st Photo Detector
22 2nd Photo Detector
23 3rd Photo Detector
24 4th Photo Detector
25 Lens for Direction Detection

26 Photo Detector Array for Direction Detection
27 Switch
28 Preamp Group
29 Demodulator Circuit Group
30 Infrared Light for Direction Adjustment
31 Voice Input Circuit
32 A/D-Conversion Circuit
33 I/O Section
34 Modulation Circuit
35 Light Figure for Direction Detection
36 1st Condenser Lens
37 2nd Condenser Lens
38 3rd Condenser Lens
39 4th Condenser Lens
40 Servo Control Circuit
41 Mountain-Climbing Servo Control Circuit

[Translation done.]

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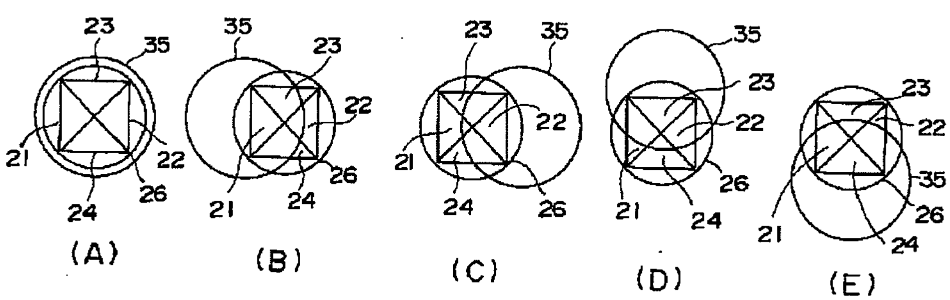
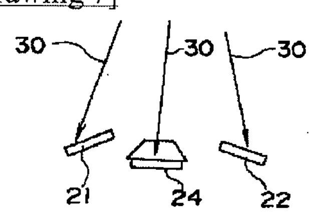
DRAWINGS

[Drawing 2]



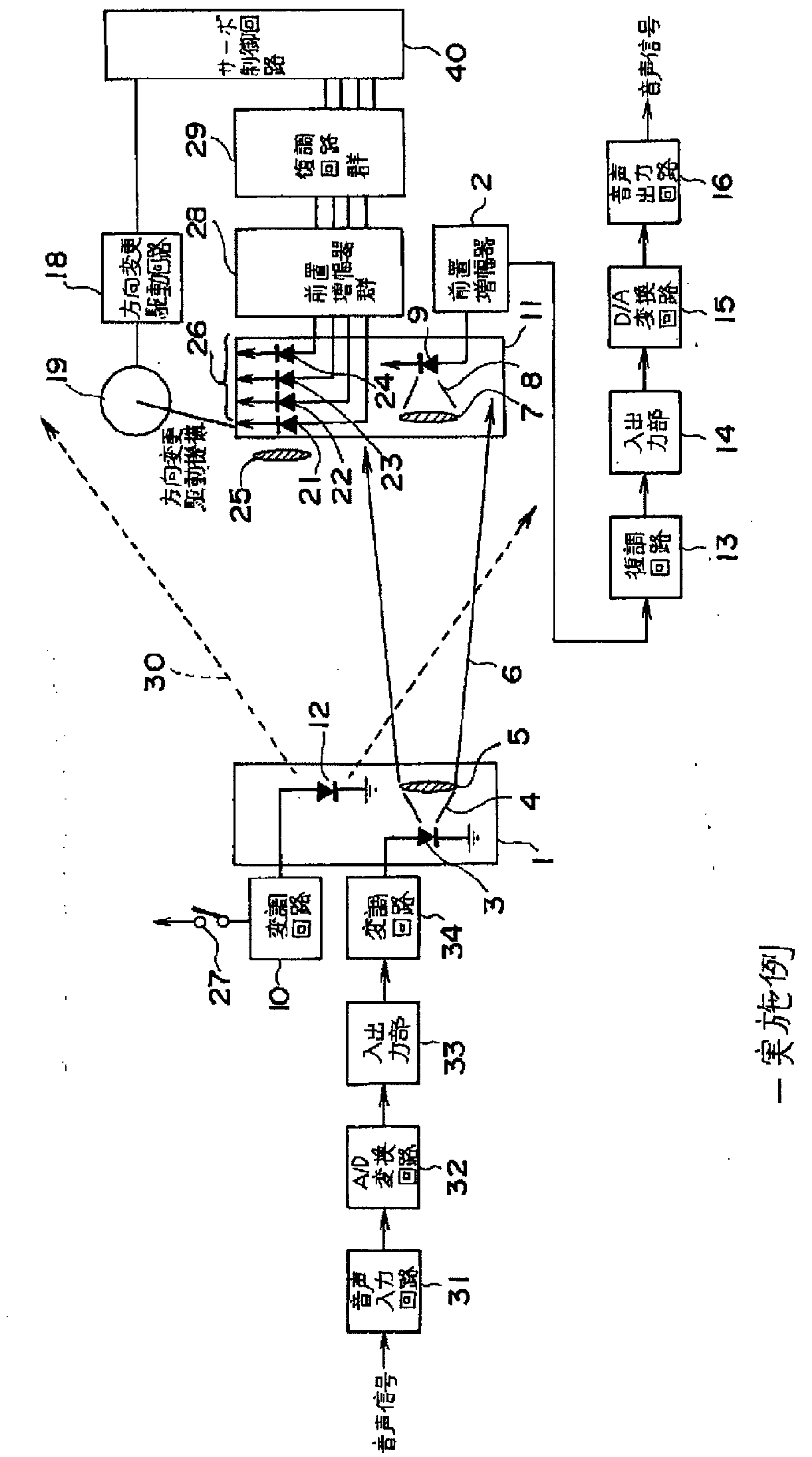
方向検出用受光素子アレイの説明図

[Drawing 7]



方向検出用受光素子アレイの別の例の説明図

[Drawing 1]


サーボ制御回路
40
復調回路群
29
前置増幅器群
28
方向変更駆動回路
18
19
26
方向変更駆動機構
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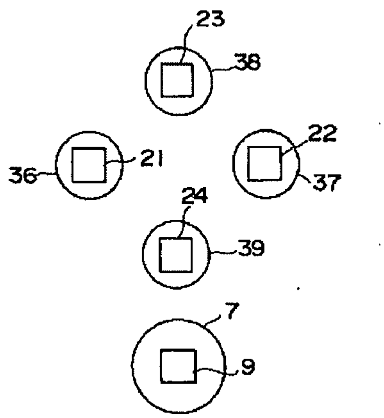
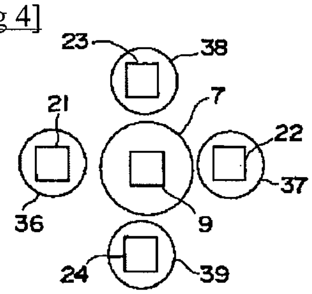
一実施例

[Drawing 3]



方向検出用受光素子アレイの
他の例の説明図

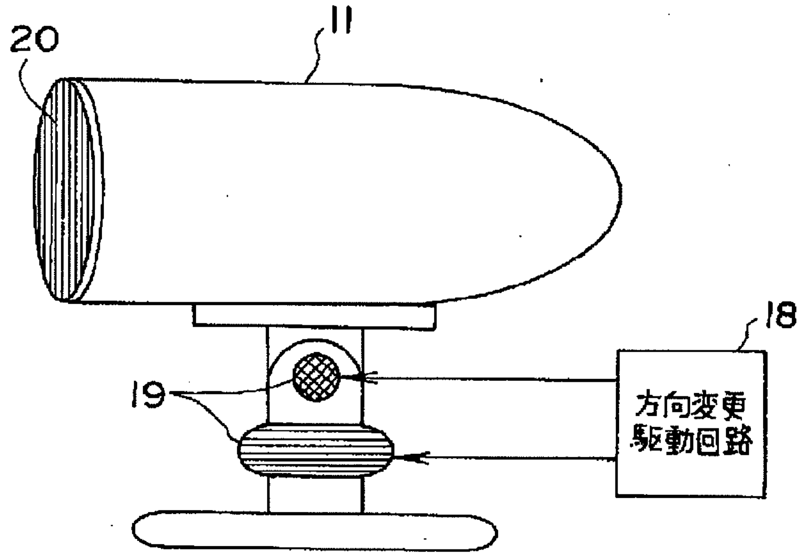
[Drawing 4]



方向検出用受光素子アレイの
更に他の例の説明図

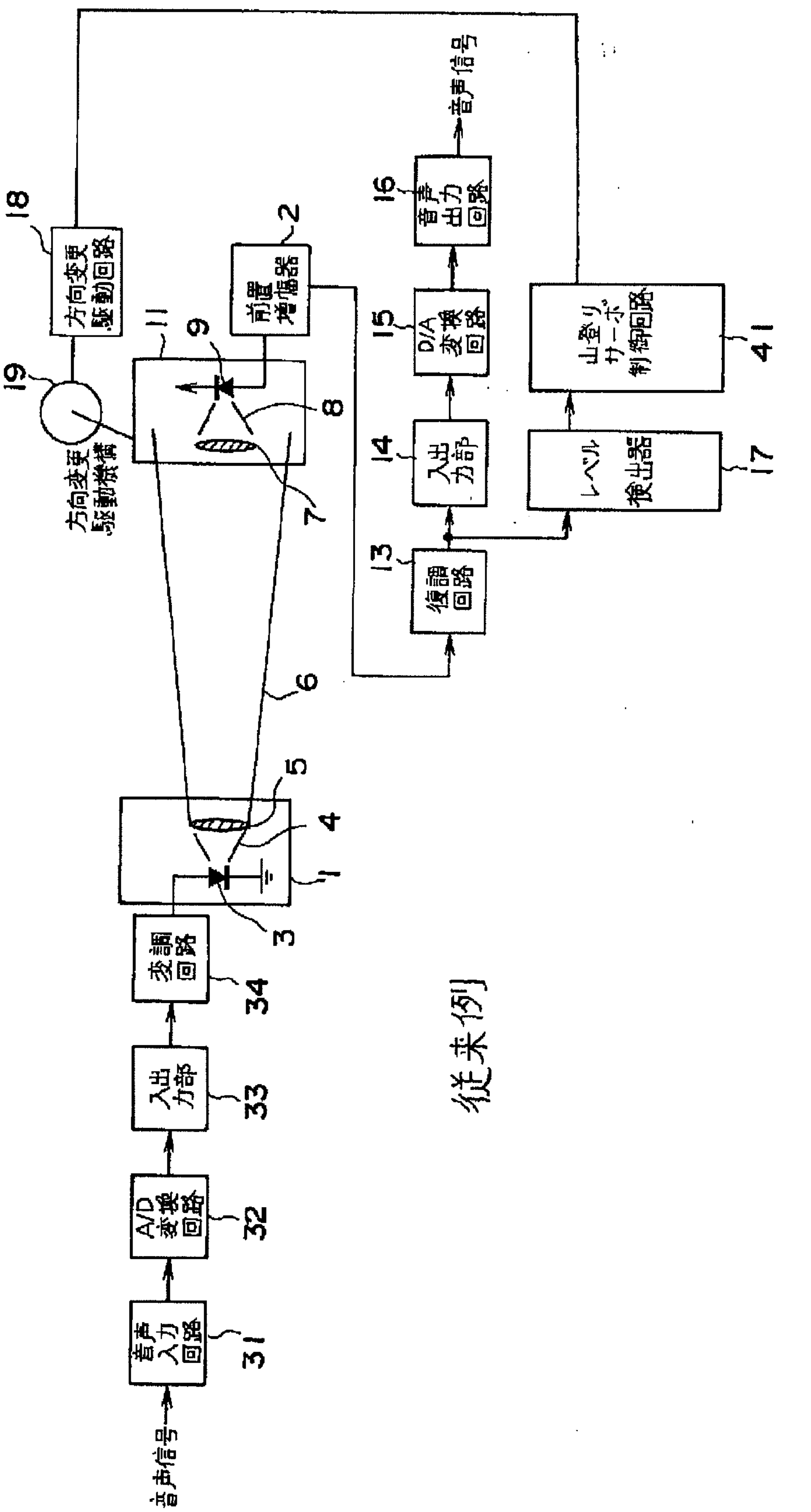
[Drawing 6]

【図６】



受光部外観図

[Drawing 5]



従来例

[Translation done.]